

FORESTRY SCIENCE IN THE SERVICE OF MAN



March 1969



Research In The Sugarbush

A stack of pancakes, steamy and lightly golden, with gobs of melted butter and a generous pool of maple syrup slowly dripping over the sides. What a luscious picture for the early morning breakfast table!

Pancake enthusiasts probably think of their maple syrup as a touch of the old-fashioned. Yet, maple syrup, produced in America for over three hundred years, is growing up as a modern industry. No more is it simply a matter of boring a hole in a tree, inserting a spout, and hanging a bucket. No more are the men, women and children dumping full sap buckets into gathering tanks on top of snowsleds drawn by oxen or horses.



Today, thanks to research by many people, there are plastic bags, plastic tubing, and vacuum pumps to gather maple sap in the sugarbush country, helping to update this farm based industry.

Americans consume 3 million gallons of maple products each year. The American sugar maple industry supplies only 1-1/2 million gallons to meet this demand. The other 1-1/2 million gallons is imported from Canada. This is incongruous when there are

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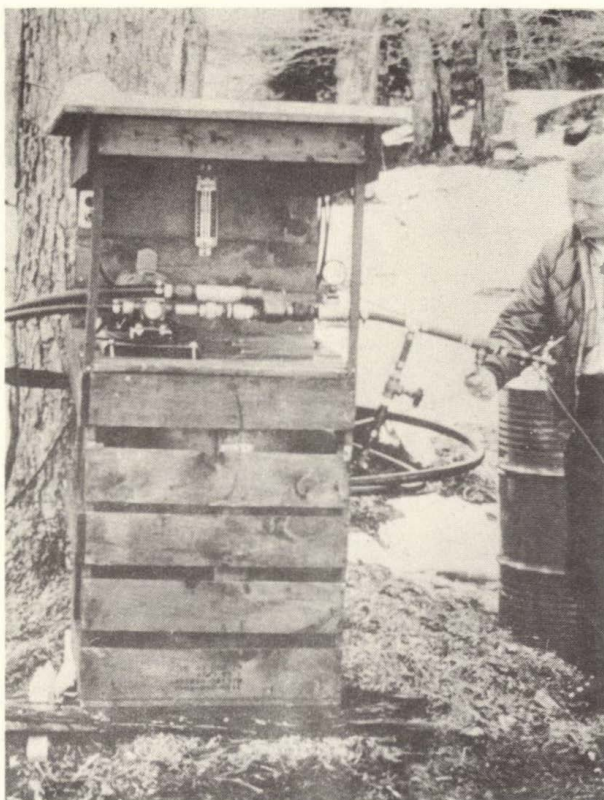
NORTHEASTERN FOREST EXPERIMENT STATION • UPPER DARBY, PENNSYLVANIA 19082



American sugar maple trees a-plenty -- at least 100 million of them -- going untouched and untapped.

The Forest Service, U. S. Department of Agriculture is helping producers increase maple sap production. Forestry scientists at the Sugar Maple Laboratory in Burlington, Vt., are working to make maple sap production a more efficient and profitable enterprise. In the Northern States from Maine to Minnesota, and south to West Virginia, they are encouraging small woodlot owners and farmers to supplement their incomes and to boost the maple sap supply by getting involved in this under-producing industry.

Flow Increasing Techniques



Vacuum Pump

Plastic tubing is one key to future production increases. Scientists report that tubing, attached to tapholes, reduces the labor costs involved in collecting sap, keeps sap cleaner, and cuts loss due to spillage.

Burlington scientists working with vacuum pumped tubing found that the presence of a vacuum in the taphole actually draws sap from the tree, and increases the amount of sap released. It also helps overcome reabsorption.

Introduced in about 1960, the vacuum pump, applied to unvented plastic tubing, helped to increase sap yields over 300 percent in a recent test. Previous tests demonstrated the value of unvented tubing by

showing that a natural vacuum, which developed in tubing stretched from tree to tree approximately 18 inches below the taphole, could increase the flow of sap itself as much as 43 percent.

The vacuum pumping method is further advantageous, because it gets more sap during low flow days, as well as during high flow periods. And on flatland, vacuum pumping eliminates the bother of having to lay out tubing to create an artificial slope.

X Marks The Spot

Since tapping causes stained and unproductive wood in the areas above and below the taphole, Burlington scientists designed a simple taphole marker to help the sugarbush tapper locate last year's hole, and thus avoid the unproductive spots. The marker is a short strand of weather-resistant material anchored in a wooden peg which is inserted in the taphole.

Sweeter Trees

The average sugar concentration of maple sap is 2.5 percent. Since it takes approximately 35 gallons of sap from a tree with 2.5 percent sugar concentration to produce one gallon of syrup, it is better to tap trees that have higher sap sugar percentages. A few trees are known to have sap with sugar concentration as high as 9 percent. Only 10 gallons of sap from these trees is needed to make one gallon of syrup. Thus, the water that must be evaporated is reduced by 75 percent, a significant factor in the cost of sap processing.



Checking vacuum on a vacuum pump tubing system.

Burlington scientists have located some of these sweeter trees and are exploring their genetic make-up, for future mass production through breeding. Tests are also underway to develop procedures for establishing the superior sugar maples by seeding, planting and the rooting of cuttings. The ultimate goal is to upgrade the sugar maple orchards of the future.

Genetics Research Looks Forward To Sweeter Trees

Researchers tap a two-year-old sugar maple seedling, produced in the Burlington Laboratory under the genetics study program...



From this needle, inserted in the taphole, a droplet of sap will pour...

When the percentage of sugar in this droplet is measured with a refractometer, scientists can determine whether this particular maple seedling may have the potential to be a quality sap producer.

